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ABSTRACT

A guide used by inservice teachers and agency caseworkers in three 2-week summer institutions (1973) for teaching visually handicapped children and adults how to read with the Optacon, a portable optical-to-tactile-converter, is presented. The institutes are said to have been of a two-year special education pilot project to demonstrate usefulness of the Optacon. Institute personnel and participants are listed. The Optacon is described in terms of development through a government/university/industry program, unaided reader use with any type between six and 20 points, and portability (4 pounds). Operation is discussed whereby a reader tracks regular print with a camera and reads on a tactile array which contains vibrating pins. Listed in the course outline for teaching reading with the Optacon are components such as instructional materials, strategies, and psychological factors. Competencies for teaching integration of motor, perceptual, and cognitive skills are specified for teachers and such techniques as remembering a serial sequence of letters to recognize a word are suggested. Appendixes comprise more than half the document and contain the following components: instructions for presenting letters to Optacon readers such as describing lower case "h" with "left ascenter is attached to one hump"; tapes listed by type font and record speed in areas such as word recognition, building, and speed skills; sample training logs including information given by tracking aid used, control settings, camera materials, and comments/difficulties; and lists of books, publishers, training materials, and tests to evaluate student potential for learning to read with the Optacon. (MC)

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SPECIAL STUDY INSTITUTES
SUMMER 1973

PROFESSIONAL PREPARATION OF TEACHERS OF READING WITH THE OPTACON

DEPARTMENT OF SPECIAL EDUCATION
AND REHABILITATION
SCHOOL OF EDUCATION
UNIVERSITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA

EC 060 323

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SPECIAL STUDY INSTITUTES

Summer, 1973

TOPIC: PROFESSIONAL PREPARATION OF TEACHERS OF READING WITH THE OPTACON

CONDUCTED BY:

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FUNDING SERVICES

The Richard King Mellon Foundation
Pittsburgh, Pa.

CONTENTS

I	INTRODUCTION	1
II	PERSONNEL	3
III	THE OPTACON	5
IV	INSTRUCTIONAL PROGRAM	9
	APPENDIX	

INTRODUCTION

The purpose of three separate, two week, Special Study Institutes conducted by the Department of Special Education and Rehabilitation, University of Pittsburgh, was to provide professional preparation for selected participants from schools and social agencies to teach reading with the Optacon to children and adults. These institutes were an integral component of a larger project developed through the Richard King Mellon Foundation of Pittsburgh, Pa., which is sponsoring a two year pilot project to demonstrate the usefulness of the Optacon. The Richard King Mellon Foundation supported the institutes, and provided training equipment for the Department of Special Education and Rehabilitation to use for these institutes and for the future professional preparation of teachers of the visually handicapped enrolled in the graduate program of that department. To the author's knowledge, this is the first university training which has been offered for preparation of teachers of the Optacon.

Those who attended the first two institutes were selected by the educational institutions and social agencies which were participating in the Richard King Mellon Foundation project. All 27 participants held degrees in education, or were social case workers who had previous experience teaching blind clients. The third institute was conducted for University of Pittsburgh students in the master degree program

in the Department of Special Education and Rehabilitation. These students all received degrees in August, 1973, and are presently teaching visually handicapped children in Pennsylvania, Massachusetts and Rhode Island. In addition to participants who were preparing to teach reading with the Optacon, five blind social case workers volunteered to serve as subjects for the teachers' practical experiences. The institutes were visited by administrators of the schools and agencies.

Telesensory Systems, Inc (TSI), the developers and producers of the Optacon, cooperated directly with the Department of Special Education and Rehabilitation in the development of curriculum and presentation of the material. Mrs. Nancy Tavis, a teacher in the Palo Alto Optacon Training courses conducted by Telesensory Systems, Inc., served as an active consultant through the first institute. Mr. Phillip Davis who is responsible for the maintenance of all Telesensory equipment in Western Pennsylvania, served as a consultant through all three institutes.

This overview of the institutes presents a model developed for a university course to prepare teachers to teach Reading with the Optacon and a brief discussion of the material included in the course.

M.W.M.

II

PERSONNEL

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III

THE OPTACON[1]

The need for a direct translation reading machine for the blind has been apparent for many years, and several machines have been developed for this purpose. The Optacon (Optical-to-Tactile-Converter) was originated by Professor John G. Linvill, Chairman of the Electrical Engineering Department, Stanford University. Together with Dr. James C. Bliss, who had been working through Massachusetts Institute of Technology of stimulation through tiny air jets, Dr. Linvill first developed a tactile screen utilizing an array of vibrating pins which can be considered the most critical feature of the Optacon. At that stage, the pins were driven by a computer. The ability of blind students at Stanford University, who volunteered to be subjects for the experiment, to learn to read the images produced on the tactile screen established the feasability of the machine. In 1968, the U.S. Office of Education awarded a five year grant to Stanford Research Institute and Drs. Bliss and Linvill and their colleagues developed the necessary integrated circuits, camera, and silicon retina to produce a portable reading machine. In 1970, ten of these first model machines were

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[1] The author is indebted to Telesensory Systems, Inc., for the material included in this section.

produced and were used, and are still being used, by Stanford students, SRI Computer Programmers, and students in the Monroe School District, California. This first model weighed nine pounds. In 1971 a smaller four pound Optacon was developed and Telesensory Systems, Inc. was formed to produce the machines. This symbiotic combination of government, university and industry to produce an effective adjunct to braille and recordings for reading by the blind has been unique in the field.

While reading with an Optacon is relatively slow, the advantages of direct personal reading, thus eliminating the necessity for dependence upon a reader, recorder or translator, are many. To look at the Optacon from a potential employment aspect, blind persons can do most tasks that sighted persons can do, except read. In industry, many employers do not want volunteer or paid readers coming into their plants and learning plant or business operations. In social agencies, the confidentiality of records must be maintained and some blind persons are rejected because they must have "outside" readers. Reading with the Optacon does not impose another person between the material and the blind employee.

From an educational viewpoint, the Optacon enables a blind student to have access to critical material when he needs it. With the proper accessories, it enables the student to read computer terminal print outs and to utilize electronic pocket calculators which facilitate success in the math and computer courses which many blind students are choosing. For the younger student, the Optacon can be utilized for the development of a sighted perspective to rather difficult material such as math and science, enhancing learning of these subjects.

The privacy and personal independence which the machine makes possible for a blind person is invaluable. Independent management of personal finances, private written communication with sighted friends, and organization of personal papers and records are possible when the blind person can read print. Loren Schoof, blind research associate in Stanford's Applied Electronics Laboratory, used his Optacon to vote in the national election, which was probably the first time a blind person has been able to cast a secret ballot!

The Optacon converts light energy which involves the camera, to mechanical energy which involves the electronics and the tactile array. Each of 144 photocells in the silicon retina portion of the camera is capable of making a light-dark decision which tells a corresponding tactile pin on the tactile screen to vibrate or not to vibrate. The 144 photocells in the silicon retina are arranged in a matrix of six columns and 24 rows which corresponds, one-to-one, with the pins in the tactile screen arranged in the same matrix. In the normal mode, the photocell which makes a "dark" decision results in a vibrating pin. Thus a dark letter upon a light background will be exactly reproduced on the tactile array. A complete guide to the principle and structure of the Optacon, accessories, and teaching aids is contained in the curriculum materials available from Telesensory Systems, Inc.

There have been developed alternative machines for direct translation. The Optaphone, Visatoner, and more recently, the Stereotoner are machines which convert print to auditory response. These machines necessitate that the reader learn the auditory responses produced. They are somewhat

limited in the type font and spatial format of the material which can be read. For instance, they are not adequate to reading math, since math is wirtten in two dimensions and the position of a symbol above, below or on the line is meaningful.

Another instrument, the Transicon, utilizes a computer terminal, automatically scanning the print and producing output in braille or in voice simulation (spelling or words). This instrument is limited in the type face which can be read. Disadvantages include cost of operating the system and loss of confidentiality of material which is processed through the computer.

The present Optacon is completely portable, being carried in a small leather case with a shoulder strap. It operates on batteries or AC current. It is not limited in the type face which can be read. It is capable of reproducing any type between 6 point and 20 point in size. The versatility of material which can be read is limited only by the perceptual and interpretive abilities of the reader.

IV

INSTRUCTIONAL PROGRAM

The strategies employed in teaching reading with the Optacon seem to indicate that the teacher should be competent to: assemble and care for the Optacon and the various teaching aids; free track, keeping the image consistently in the optimum position for reading; describe letters and words in terms which enhance tactual recognition; select or develop curriculum materials for remedial instruction; and develop language and reading skills unique to Optacon reading. The blind teacher of a blind student needs to be a competent reader with the Optacon; however, the sighted teacher who will utilize a Visual Display to monitor the activities of the blind student need not necessarily be a competent reader with the Optacon. The objectives of the Special Study Institute course were developed on the assumption that the entering students were teachers who were prepared to teach other subjects, including braille reading, to blind children and adults. In the future, the Department of Special Education and Rehabilitation will include instruction in teaching reading with the Optacon in the master's degree program for the Education of the Visually Handicapped. This instruction will be coordinated with, and in addition to present courses in braille reading and writing.

Previous preparation of teachers of reading with the Optacon, has been based upon an apprentice type model, with the teacher observing, practice teaching under supervision, and eventually taking responsibility

for the entire teaching of one blind student. The University model presented here has been developed for the instruction of a class of sighted teachers, and endeavors to develop required competencies using didactics and simulation.

TEACHING READING WITH THE OPTACON
COURSE OUTLINE

I Introduction to Optacon
- a. History of Development
- b. Educational & Vocational Application
- c. Structure of Optacon, Teaching Aids & Accessories
  1. Tracking Aid
  2. Visual Display
  3. Optacon Cassette Trainer
  4. Master-Slave Cable

II Instructional Materials
- a. TSI published curriculum
- b. AIR curriculum
- c. Tobin's curriculum
- d. San Diego Public Schools curriculum
- e. Independent Reading Materials

III Instructional Strategies
- a. Introduction of Machine to Blind Student
- b. Development of Tracking Skills
- c. Teaching Recognition of Letters and Words
- d. Speed Building Techniques
- e. Logging Techniques
- f. Problem Solving Techniques

IV Psychological Factors
- a. Screening Procedures
- b. Assessment
- c. Affective Factors
- d. Perceptual & Interpretive

V Relevant Research

VI Administration of Agency and Educational Programs

Objectives: Teachers will:

1. Demonstrate check-out procedures for Optacon & Teaching aids
2. Free track camera on curriculum materials & selected books
3. Describe upper and lower case letters in terms of critical features
4. Correct selected tracking and recognition errors of students
5. Teach recognition of at least nine upper case and nine lower case letters to blindfolded (or blind) subjects.

Reading with the Optacon involves the integration of motor, perceptual and cognitive skills, and a teacher must have teaching competencies in all three areas. Simulated teaching experiences under blindfold were provided to develop sensitivity to the fine camera movements necessary to keep the image of a letter in the optimum position on the tactual screen, and to develop awareness of interaction of the magnification-threshold controls to produce the most readable image. Each participant also served as teacher to another and practiced the teaching strategies employed with blind students which develop the coordination of motor skills with perceptual skills for reading. The teacher needs to develop personal motor skills to free track with the camera for the student. Each participant practiced this skill with his own Optacon and Visual Display. Reading Braille and reading with the Optacon are involved with tactual perception of spatial relationships within characters. However, reading Braille is in some ways easier, since the components of letters are simplified and spacing is consistent. The teacher of reading with the Optacon must be able to develop the perceptual skills of students to discriminate the critical features of letters which identify them. The use of precise language is important and [illegible] provided with guides for this instruction. (See Appendix).

Ashcroft[1] has presented the premise that "reading; no matter what the medium, fundamentally involves the same psychological processes, and has as its purpose the communication of meaning. The literature on conventional reading is in rather general agreement that the minimum essential factors in reading are perception and interpretation... What differences there are, lie largely in the differences in modality that is, touch in contrast to vision..." These differences determine, to some extent, the skills necessary for effective reading.

A normal visual field enables the reader to process the information given by about a seven letter span in a single fixation, and in visual reading, the eyes proceed in saccadic movements as they track along a line of print. The individual letter is not the informational unit; words and groups of words are treated as informational units. Foulke[2] has pointed out, "Because of the limited sensory area on an index fingertip, not much more than one Braille character can be sensed at a time... tactual perception requires movement of cutaneous tissue, and little movement takes place while the fingertip is at rest, as it would be during periods of fixation." Nolan and Kederis[3] showed that the time required to identify a word written in Braille is usually greater than the sum of the times required to identify the Braille characters of which that word is constituted. To speed this information gathering process in braille, a system of contractions has been

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1 Ashcroft, Samuel C. "Errors in Oral Reading of Braille at Elementary Grade Levels," in Report of Proceedings of Conference on Research Need in Braille. New York: American Foundation for the Blind, 1961.

2 Foulke, Emerson, "Non-Visual Communication: Reading by Touch", Education of the Visually Handicapped, 1970, II, n. 3, p. 88.

3 Nolan, C.Y. and Kederis, C.J. Perceptual Factors in Braille Recognition. New York: American Foundation for the Blind, 1969.

devised which enables a single character to convey the information which would ordinarily be contained in several letters. This contracted system has created sources of error in reading and questions about the teaching of Braille reading which have concerned educators for some time. Since the Optacon is employed with print medium, the informational unit is a single letter. Experiments with two-finger reading and with presentation of two letters to a single finger have indicated that the reader does not gain in speed by these methods. At the present time, little research has been done to establish the specific cognitive skills which need to be developed to increase the speed of reading with the Optacon. Since it is not practical with the Optacon to scan ahead in a sentence for contextual clues to the meaning of a word, other skills of word analysis and anticipation of words and word endings would seem to be important. Familiarity with letter blends, frequent combinations of letters, prefixes, and suffixes will increase speed of reading. To recognize a word, the reader with the Optacon is required to remember a sequence of letters presented serially. The ability to process the information of individual letters in "chunks" or phonetic groups is important. One of the problems with the development of the phonic skills in the teaching of reading with Braille is the lack of one-to-one correspondence between the print and braille symbols. For example, it may be confusing to a beginning reader to recognize the existence of a long "O" in the word "stone" which employs a two-cell contraction ordinarily pronounced as "one". It may be that Braille readers will lack some phonetic skills which are important to Optacon readers. Through discussion and a review of pertinent research, participants in the institutes were encouraged to consider such problems and their influence

in the preparation of appropriate and meaningful curriculum materials for the wide range in age of the students they were planning to teach to read.

One teaching accessory developed by TSI is the Optacon Cassette Trainer (OCT) which is a portable, computerized machine through which pre-recorded tapes can present images to the Tactual Screen without the camera and at variable speeds. Practice exercises and stories have been recorded at TSI (See Appendix). The teachers at the Institute utilized this machine to assist them in establishing proper finger position, size of letters, and optimum positioning of letters on the Visual Display and to use in speed building.

To enable the teachers to become familiar with all the curriculum materials and to have some experiences with typical problems and methods of solving them, the teachers used a system of daily activity logging which has been employed at the TSI Training Center. The teachers also learned to keep careful records of the specific difficulties displayed by each student for communication with other teachers and/or to enable them to use their own teaching time efficiently. The teachers would probably need to adapt or modify the TSI logging system to suit their particular administrative patterns; however, during the Institutes, these logs served as vehicles for their training. Case study logs with problems incorporated were devised and the teachers were required to provide references to specific remedial materials or remedial teaching strategies to solve these problems. (See Appendix).

Instructional materials for the use of teachers of Reading with the Optacon are available from several sources. The San Diego City Schools

developed materials for use in an Optacon Project and these materials are available through them.[1] The sequence of presentation in these materials is: (1) non-meaningful shapes and symbols, (2) upper case letters presented in six letter groups OIBSTG, EUDFNP ..., (3) simple words and short sentences within each letter group, (4) lower case letters presented in the same order as upper case, (5) reading rate building exercises, and (6) exercises involving complex type styles. Goals for each lesson are stated and criteria given.

Michael Tobin[2], developed materials to be used in a research project conducted through St. Dunstan's in England. These materials are not, thus far, available in this country. The sequence of presentation is: (1) lower case letters, (2) numerals, (3) upper case letters contrasted one-to-one with lower case letters, and (4) prose practice. These materials are presented according to Gagne's model in which aims are stated in measurable or objectively identifiable terms and pre-tests and post-tests are provided.

The American Institute of Research in Palo Alto,[3] after a "comprehensive review of existing educational strategies for the teaching of reading ... study of approaches utilized by TSI and San Diego Project ... and proposed strategy laid before Gagne and others," developed materials to be used in conjunction with a U.S. Office of Education supported

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[1] Gale W. Lutz, San Diego Unified School District, San Diego, California, 1973.

[2] M.J. Tobin, Research Centre for the Education of the Visually Handicapped School of Education, University of Birmingham, Birmingham, England, 1973.

[3] American Institutes for Research, P.O. Box 1113, Palo Alto, California.

evaluation project being conducted throughout the U.S. Fifty Optacons have been placed in approximately thirteen sites and feedback data is being collected. Thus far, no report has been issued on this research project. The AIR is revising these materials and will offer them for commercial sale in the near future. The sequence, developed on the basis of frequency of use of letters in the English language, is: (1) numbers in order, (2) upper case letters A T R E, (3) lower case letters a t r e, (4) upper case I H O S, (5) lower case i h o s, etc. Supplementary exercises include remediation exercises, common words, sentences and additional type fonts. Criterion exercises are included, but criterion is not stated.

Telesensory Systems, Inc.[1] has developed curriculum materials for instruction of blind readers, which are available through this company. (See Appendix).

The materials were developed originally from experience with students at Stanford and were tested with high school students and, in 1971, a student at the University of Oklahoma. Iterative revisions have been produced based upon experiences with adult students at Seeing Eye and adults at the TSI training center in Palo Alto.

The sequence of presentation was developed according to order of difficulty as experienced by blind readers: (1) upper case letters O C I S E, T H A M ..., through the entire alphabet, (2) lower case letters o c i s e, t h a m ..., in the same order, (3) numbers. Required and optional practice exercises and criterion tests are provided. Letters are first presented as separate letters, then connected into words and

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[1] Telesensory Systems, Inc., 2626 Hanover Street, Palo Alto, California.

sentences. Practice exercises of different type styles, frequent letter confusions and unique reading problems are included in the Student Manual. The Independent Practice Manual can be used for reinforcement of skills or for remediation. The Stage Two Manual consists of examples of difficult format materials, different type fonts and difficult reading materials such as mathematics. A complete Teacher's Guide is now available. The TSI materials were used as curriculum for the Institutes at the University of Pittsburgh.

Teachers need, also, to have a library of commercial books in appropriate type styles and reading levels to be used by student readers for "real-life" practice. An annotated Bibliography of books was prepared and distributed to the participants. (See Appendix).

Some investigation with adults has been made into the development of a battery of tests which could be used for screening or for predicting success in reading with the Optacon. Michael Tobin, in an experimental investigation into the relationship of certain psychological variables to successful reading, found I.Q., tactual discrimination and age to be significant. His population, however, included only adolescents and older blind persons. The participants at the Institute considered some tests (See Appendix) which could be utilized for assessing capabilities, but since, at the present time, no valid predictive criteria exist, it seems probable that the most suitable method of prediction would be to try the candidate on the Optacon itself.

Experiences in the University of Pittsburgh Special Study Institutes have been incorporated into the TSI Teaching Guide (See Appendix). This

publication presents in further detail the mechanics of the equipment and teaching strategies. It will be an invaluable aid for teachers.

It is hoped that this overview of the Institute which was conducted by the Department of Special Education and Rehabilitation, University of Pittsburgh, will provide some background for the establishment of other University and college level training courses. Members of the Department of Special Education and Rehabilitation welcome requests for further information, and offer their assistance to any future training programs.

APPENDIX I

PRESENTATION OF LETTERS TO OPTACON READERS

Whether or not the student is familiar with print, time and care must be taken to present an accurate image of the letters as they will appear tactilely on the Optacon. Contrary to many new teacher's thinking, formerly sighted students who know letter shapes are not necessarily at an advantage in learning Optacon reading. Students often have a faulty memory of letter details (direction of diagonals, descenders, etc.) Some confuse lower case print with handwritten letters. Others have difficulty transferring their memory of the total letter as perceived visually to a tactile image moving from right to left across the array.

When describing the letters to students, care should be taken to talk of them as a moving image, "coming in" and "going out". Students feel the left edge of the letter first, then the middle, then the right edge. Questioning should be, "What do you feel 'coming in'? What next? etc."

Explain the relationship of the letters to a line - letters "sit" on an imaginary line that should be two-thirds down the array. Demonstrate with a horizontal line of print.

Language should be geared to the language level of the student. Descriptions presented here assume an understanding of the terms "ascender", "descender", "horizontal", "diagonal", "vertical", "hook", and "hump". Simpler terms such as "hats", "tails", "balls", "sticks", etc. could be used with children. Once the terminology is chosen and understood by the student and teacher, it should be used consistently throughout training.

Steps in letter presentation:

1. Student looks at the letter as often as he likes.
2. Student describes only what he feels. (Discourage naming what letter he thinks it is).

3. Student looks at letter again - question "What else do you feel?" "Top"? "Bottom?" etc.
4. Teacher reaffirms oral description of letter shape, and names the letter. Give alternate descriptions if unclear.
5. Methods for reinforcing the student's image of the letter shape (do as needed)
   - check shape on raised plastic tile
   - using your finger, draw letter on student's hand - have him draw it on your hand
   - student draws letter on thermoform paper

NOTE-Even students who think they know letters thoroughly should draw the letter for the teacher.

6. Student again looks at the letter several times with the Optacon.

Upper Case Letters in groups most often confused by Optacon readers:

Horizontals

P B R E F H S

Circles

C G O Q D

Verticals

I J L T U

Diagonals

M N V A W X K Y Z

NOTE: Upper Case Letters should fill the top 2/3 of the array and should "sit" on an imaginary line 2/3 of the way down the array.

Description of Upper Case Letters - general description (from left side to right side)

C.F. Critical features of letters for avoiding confusions.

A - Diagonal from lower left to upper right, forming a point with a reverse diagonal; a horizontal connects the diagonals at mid-point

CF. point at top (V)

B - left vertical with two curved sideways humps connecting top, middle and bottom (may be seen as 3 horizontals closed on right by curved lines)

CF. - closed on right (E)

- closed on bottom (P,R)

C - large circle with opening on the right

C.F. opening on the right (O)

D - left vertical with curved sideways hump to the right, connecting top and bottom

C.F. - flat vertical on left (O)

E - left vertical with 3 small horizontals attached at the right top, center, and bottom (center horizontal is sometimes slightly shorter)

C.F. - bottom horizontal (F)

- open on right (B)

- closed on left (S)

F - left vertical with short horizontals to the right from the top and middle of the vertical

C.F. - no bottom horizontal (E)

- open at right (P)

G - large circle with opening on the right and a small internal horizontal attached to the lower right opening

C.F. - small horizontal - (C)

H - left vertical with small center horizontal connecting a right vertical

C.F. - open top and bottom (B)

- horizontal connector (N,M)

I - vertical line (sometimes has small feet top and bottom) - same as "small L" in many prints

C.F. - no horizontals top (T) or bottom (L)

J - bottom left hook connecting with right vertical (sometimes has a small horizontal "hat" on top)

K - left vertical line with two diagonals fanning to the upper right and lower right from its mid-point

C.F. - vertical on left (X)

- open on top (R)

L - left vertical with small horizontal attached at the bottom right

C.F. - bottom horizontal (I)

M - left vertical; diagonal from upper left to bottom right; reverse diagonal; right vertical (widest letter - usually won't go on screen all at once)

NOTE - diagonals are sometimes only half the depth of the verticals

C.F. - 2 diagonals (N)

- vertical on sides - (W)

N - left vertical; diagonal from upper right to lower left; right vertical

C.F. - one diagonal (M)

O - large closed circle

C.F. - no openings (C,G)

- curved on left (D)

P - left vertical with curved sideways hump to the right connecting the top and middle

C.F. - open on bottom (B)

- closed on top right (F)

Q - large circle with small diagonal line intersecting at the lower right ("tail" sometimes extends down from center bottom in some type fonts)

C.F. - "tail" (O)

R - left vertical with curved sideways hump to the right connecting the top and middle, and a diagonal line extending from the hump to the lower right

C.F. - Open on bottom (B)

S - large upper left sideways hump connected to lower right sideways hump (Can be seen as 3 horizontal closed by diagonal curved lines upper left and lower right)

C.F. - openings bottom left and top right (B,E)

T - top horizontal line with a vertical extending down from its midpoint

C.F. - horizontal at the top (I)

U - left vertical with a curved line from the bottom connecting a right vertical

C.F. - connector on bottom (H)

- curved on bottom (V)

V - diagonal from upper left to lower right, forming a point with a reverse diagonal

C.F. - one point on bottom (W)

W - two V's connected

C.F. - diagonal edges (M)

- wide letter (V)

X - two diagonals intersecting at midpoint

C.F. - open on left (K)

Y - small -V in upper half of the array with a vertical extending down from the point

C.F. vertical below (V)

Z - horizontals top and bottom connected by a diagonal from lower left to upper right

Lower case letters in groups most often confused by Optacon readers.

basic circles

a c e o s

pot porri

b d h m n u

verticals

f i l r t

descenders

g j p q

diagonals

v w x y z k

NOTE: lower case letters should fill the middle 1/3 of the array with ascenders touching the top of the array, and descenders touching the bottom

a - small circle with hook above, attached vertical on the right

C.F. opening on upper left ("coming in") (e,s)

b - left ascender attached to small circle

C.F. - ascender on left ("coming in") (d)

- closed on bottom (h)

c - circle with opening on right

C.F. - opening on right ("going out") (o)

d - circle with right ascender attached

C.F. - ascender is on right (b)

e - circle with horizontal line through middle and opening in lower right

C.F. - opening lower right (a,s)

- horizontal (a,s)

f - tall vertical with right hook at the top and crossbar in the middle

C.F. - hook at the top (t)

- tall (r)

g - two circles, one above the other, connected on the right with a line (can be described as "eyeglasses turned on their side") C.F. connected on the right (B) - descends below the line opening between circles (8)

h - left ascender attached to one hump

C.F. - ascender on left (n)

- open on the bottom (b)

i - short vertical with a dot above it

C.F. - gap between line and dot (i)

- no hook or descender (j)

j - vertical descender with bottom hook to the left; dot over it

C.F. - descends below line (i)

k - left ascender with a small "v" fanning outward in lower portion

l - tall vertical

C.F. - tall, solid line (i)

- no hooks or crossbars (f,t)

m - short left vertical with two humps attached to the right

C.F. - two humps (won't) all fit in array) (n)

- humps are closed and rounded on top (w)

n - short left vertical with one hump attached

C.F. - one hump (m)

o - small circle

C.F. - closed on right (c)

- no verticals attached, no gaps

p - left descender attached to small circle

C.F. - descender (b) on left (g)

q - small circle attached to a right descender (sometimes has small upward rt diagonal at bottom of descender)

C.F. - descender on right (p)

r - short vertical with hook to right attached at the top

C.F. - short - (f,t)

- hook only not hump (n)

s - upper left hump connected to lower right hump seen.

Can be seen as 3 horizontals attached by curved lines upper left and bottom right)

C.F. - openings lower lefr and upper right (a,e)

t - tall vertical with bottom right hook and small crossbar in the middle

C.F. - hook on bottom (f)

Tall (r)

u - short left vertical that hooks to the right into a short right vertical ("upside-down" n)

C.F. - rounded on bottom (v)

v - short diagonal from upper left to lower right; forming a bottom point with a reverse diagonal.

C.F. = no descender (y)

- one point only (w)

w - two v's attached

C.F. - open at top, diagonal lines (m)

x - two short intersecting diagonals

y - short diagonal from upper left to lower right, connecting to a reverse diagonal descender with left hook on bottom

C.F. - has a descender (v)

z - two parallel horizontals attached by a diagonal from lower left to upper right.

APPENDIX II

TELESENSORY SYSTEMS, INC. TAPES
February 1973

READER EVALUATION TAPES	TYPE FONT	RECORD SPEED (WPM)
1. Test Tape	Block	10
Side a. Upper Case Letters EOCSC-THAM-LRUBDNGH-KJVP-QWXYZ		
Side b. Lower Case Letters eoisc-tham-lfdbr-gnuv-pykw-xzjq		
This follows the lessons in the training manual with letter and word practice		
2. Position Tape		
Side a.		10
Side b. Finger position tape using lines, circles and crosses		
Basic shapes are presented using all the areas of the array. This is used to check the sensitivity of the various parts of the finger.		
3. Additional Tape Exercises (lower case)	Block	10
Side a. Exercises to follow Lessons 10, 11, & 13 in the Training Manual.		
Side b. Exercises to follow Lessons 15, 17, & 19 in the Training Manual.		
Isolated letter and simple word exercises follow the 6 letter groupings of lower. case letters in the TSI Manual.		
4. Limited Alphabet, Speed Building	Block	10
Side a. Spaced stories using letters presented in the Training Manual after Lessons 12, 14 & 16.		
Side b. Spaced stories using letters presented in the Training Manual after Lessons 18 and 20.		
The simple stories are spaced with 5 letter spaces between the words. The stories use only the letters that have thus far been presented.		

WORD RECOGNITION SKILLS	TYPE FONT	RECORD SPEED (IPM)
1. Alphabet Tape	Block	15
Side a. Alphabet and Number Warm-up		
Side b.		
The alphabet and number tape is good to use when the student first returns to the cassette unit. The sequence of upper and lower case letters and numbers is repeated for the length of the tape.		
2. Confused Upper Case Letters	Block	10
Side a. D/O B/R M/N/W F/P V/Y		
Side b. R/K C/G C/O I/T S/Z N/H		
First the letters are presented; then the words using the letters.		
3. Confused Lower Case Letters	Block	10
Side a. Letters h, n, and b		
Side b. Letters l, f, t, and r		
First the letters are presented; then words using the letters; then, a short story.		
4. Confused Lower Case Letters	Block	10
Side a. Letters a, e, o and s		
Side b. Letters r and l		
First the letters, then words, then a short story.		
5. Confused Lower Case Letters	Block	10
Side a. Letters m, w, and n		
Side b. Letters g, p, and y		
Letters presented, then words, then a short story.		
6. Confused Lower Case Letters	Block	10
Side a. Letters p, d, b, and q		
Side b. Letters c and o		
Letters presented, then words, then a short story.		

WORD SKILL BUILDING	TYPE FONT	RECORD SPEED (WPM)
1. Word Drill	Block	15
Side a. Common Words Side b. Short Words The Words are presented several times; the spaces between words decrease as the tape continues.		
2. Word Drill	Block	15
Side a. Suffixes Side b. Suffixes continued		
3. Word Drill	Block	15
Side a. Compound words group 1 and 2 Side b. Compound words group 3, 4, and 5 Each group of Compound Words is presented with increased difficulty.		
4. Word Drill	Block	5
Side a. Common Words Side b. Short Words The common words are presented several times; the space between words decreases as the words are repeated. Two, three and four letters words are presented on the short word tape.		

SPEED BUILDING

1-1 Level One	Block	10/15
Side a. Paul Bunyan (10 wpm) Side b. Paul Bunyan (continued) (15 wpm) 5 spaces between each word.		
1-2 Level OXe		
Side a. Napoleon -- The Inkeepers Reward	Block	10/15
Side b. Napoleon -- The Inkeepers Reward (continued) The story is divided into 4 paragraphs. The first has words spaced far apart; the 2 middle paragraphs have progressively less spacing, and the final paragraph has normal spacing.		

		TYPE FONT	RECORDED SPEED (WPM)
1-3	Level One	Block	10
	Side a. "The Policeman" and "Abraham Lincoln" Side b. "The Red Cross", "The Men from Mars", and "Football"		
	These are short, humorous stories with greater than normal spacing between words.		
2-1	Level Two	Block	10
	Side a. Ants Side b. Ants (continued)		
2-2	Level Two	Pica	15
	Side a. Charles Goodyear Side b. Charles Goodyear (continued)		
2-3	Level Two	Block	40
	Side a. Indian Joe Side b. The Great Air Race		
2-4	Level Two	Pica	10
	Side a. Chanticleer & The Fox Side b. Chanticleer & The Fox (continued)		
2-5	Level Two	Block	18
	Side a. Pecos Bill Side b. Pecos Bill (continued)		
3-1	Level Three	Block	15
	Side a. Limericks Side b. Four Short Stories		
3-2	Level Three	Block & Pica	15/40
	Side a. Morse Code; block font, (15 wpm) repeated in Pica font at same rate.		
	Side b. Eskimo; block font, 40 wpm		
3-3	Level Three	Block	15
	Side a. Casey Jones Side b. Casey Jones (continued)		

		TYPE FONT	RECORD SPEED (WPM)
3-4	Level Three	Block	15/40
	Side a. A Most Unusual Father (15 wpm) Side b. A Most Unusual Father (continued) (40 wpm)		
4-1	Level Four	Block	15/40
	Side a. Wild Ride (15 wpm) Side b. Wild Ride (continued) (40 wpm)		
4-2	Level Four	Block	18/40
	Side a. Surrender at Appomatox Courthouse (18 wpm) Side b. Surrender at Appomatox Courthouse (continued) (40 wpm)		
4-3	Level Four	Block	15/40
	Side a. The Great Molasses Flood (15 wpm) Side b. The Great Molasses Flood (continued) (40 wpm)		
4-4	Level Four	Block	15/40
	Side a. The Last Pioneers (15 wpm) Side b. The Last Pioneers (continued) (40 wpm)		

VOCATIONAL

1.	Math		15
	Side a. Single digit numbers, random order Side b. Numbers including decimals and dollars		
2.	Math	Block	15
	Side a. Newspaper articles with numbers Side b. Newspaper articles (continued)		
1.	Computers (COBOL)	EZ Pica	15
	Side a. COBOL Vocabulary Side b. COBOL Vocabulary (continued		
2.	Computer (COBOL)	EZ Pica	15
	Side a. COBOL Text Side b. COBOL Text (continued) (Error Code)		

	TYPE FONT	RECORD SPEED (WPM)
3. Computers (OS Assembler) Side a. Assembler Operation Code Side b. Assembler Operation Code (continued)	EZ Pica	15
4. Computer (OS Assembler) Side a. Assembler text (10 and 15 wpm) Side b. Assembler Text (continued) (40 wpm)	EZ Pica	10/15/40
1. Language (German) Side a. "Erlkonig" by Goethe Side b. Vocabulary and Story	Block	10

APPENDIX III

Student's Name_____ TELESENSORY SYSTEMS, INC. PAGE No._____

Uses Tracking Aid?_____ OPTACON TRAINING LOG

Control Settings:
: _____ T_____ Z_____

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give Page no.'s finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (suggest tapes, camera work and problem-solving methods)

Student's Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:
I _____ T _____ Z _____

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 1 A.M.		Had some previous exposure to materials so we skipped some lessons. Finished Lesson 5.		(A) Very anxious to skip and move ahead, but needs practice and drill. (B) Tracking alone and getting better steadily. Wants to get to tracking exercises as soon as possible. (D) Doesn't "feel" bottom of B.	CAMERA: Manual I; Lesson 6. Keep learning upper case letters.
Day 1 P.M.		Manual I; Lessons 6-9	Tests 1 & 2 (did poorly)	(A) Still too anxious to push on. Thinks she is better than she actually is. (B) Watch for skewing. (D) Confusions M/W R/B C/G. Poor recognition.	CAMERA: Manual I; p.11.1 test - then go back and do "practices" for problem letters. TAPES: Repeat tests upper case 1 & 2 before going to 3, 4 or 5. If necessary, upper case confusion tape.

Student'd Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? Yes

OPTACON TRAINING LOG

Control Settings:
I 9-10 T _____ Z _____
Wants it this low - should keep it up to 11-12

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 2 A.M.		Manual 1; Lessons 5-9 Reviewed caps. Lesson 10-12.4 lower case.	None; hesitant to return to tapes.	(B) Put on tracking aid; not ready for tracking alone yet. (C) Watch finger position on array. (D) Letter recognition Ok. Word recognition not good. Recognition improved when put on tracking aid. Sensitivity seems poor. Numbs out sometimes.	CAMERA: Manual 1; Lesson 13. Do all the practices in lower case. Go slowly and practice all exercises TAPE: Upper Case Tests and confused upper case if needed.
Day 2 P.M.		Manual 1; p. 13.2, 13.3	Alphabet warm up (very good) a/e/o/s Confusion Speed #2; good second time.	(B) Stayed on tracking aid. (C) Moves finger constantly and insists on training two fingers. Changes frequently. Intensity too low. (D) Much confusion with a/e/s even after doing well with tape.	CAMERA: Manual 1; p. 13.4 Go slow; be firm about repeating material. Keep intensity to 11-12. Concentrate on keeping finger still Train one finger now. TAPE: Warm up Tape; repeat Confused Letters.

Student's Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:
I 11-12 T _____ Z _____
Despite her objections

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 3 A.M.		Manual I; pages 13.4-16.3 (skipped some practices)	Warm up (10 min.) Lower Case Test 1,2 & 3	(B) No aid; corrections improving. Needs constant reminder to relax left arm. (D) a/e/s still confused but improving. f/r confusion on tape. More trouble recognizing letters in context than alone.	CAMERA: Manual I introduce remainder of letters quickly. Page 18.2 w/k/p/y page 19.2 x/z/j/q. Do any appropriate practices for problems. TAPE: Lower Case test #4,5.
Day 3 P.M.		Manual I, review: 15.3; 17.2; 17.4; 17.6 and 17.7	None	(B) Tends to read low. After break she tracked too high. Smooth motion but much back tracking because of poor letter recognition. (D) Poor letter recognition in normal spacing. Needs much more practice with word building.	CAMERA: Manual I, page 20.2 Tests - Review of individual letters. Le Lesson 21 - appropriate exercises for confused letters. TAPE: Confused letters tape t/f/r h/b a/e/s. Lower Case Test #4,5.

Student's Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? _____

OPTACON TRAINING LOG

Control Settings:
I _____ T _____ Z _____

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 4 A.M.		Went over threshold adjustment page. Independent, Tracking; p.43, Lizard Story. Manual 1, p. 20.2 Test; p. 21.2 f/t; p. 21.4 a/e/o.	Confusion a/e/o Suffixes, speed 2 (didn't like) Short Words, speed S (liked this)	(A) Difficulties with threshold adjustment (D) Problems a/e/s t/r/f	CAMERA: Manual 1, Review pages 21.3, 21.4, Lesson 22, any appropriate exercises; i.e., 22.5, 22.8 TAPE: Repeat: Short word with speed up. t/f/r confusion. Common words
Day 4 P.M.	Independent page 30	Manual 1, pages 21.3, 21.4, 22.5 and 22.8. Independent, page 22 oo & ee	t/f/r confusion (individual letters read at higher speed) Story: problem concentrating; thinks back about mistakes & misses words.	(B) Some problem with skewing; much back tracking. (D) f/t a/e/o/s problem - g; confused by long words.	CAMERA: Manual 1, pages 22.1 - 22.4; Dictionary; go over independent, page 30.

Student's Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? _____

OPTACON TRAINING LOG

Control Settings:
I _____ T _____ Z _____

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 5 A.M.		Manual I, pages 22.1 & 22.4 Dictionary: format. Independant; page 30. Started story, should take home & finish. New Yorker; looked at.		(B) Much better tracking. Make sure she tracks slowly and doesn't back track. (D) Confuses a/e/o/s I/t/f/r (E) Get her to start reading in syllables or word chunks.	CAMERA: Wants more long word practice. Manual I; pages 22.5, 22.6 and 27.7. Start a book: J.L. Seagull, Girl Who Knew Rule One or Man the Myth Maker. TAPE: Compound Words; Suffixes (even though she didn't like before).
Day 5 P.M.		Catalogue of Catalogues. Manual I, pages 22.6 and 22.7	Short Common Words Speed #S (missed a lot).	(B) Tracking; still cutting off tops of letters. (D) Having difficulty with the longer words but improvement in reading in word chunks.	CAMERA: Independent, pages 25 & 26. Manual I, sentences, pages 22.8, 22.9 tracking practice.

Student's Name Sample Problem

Uses Tracking Aid? _____

Control Settings:
I _____ T _____ Z _____

TELESENSORY SYSTEMS, INC.

OPTACON TRAINING LOG

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 6 A.M.		Manual 1, pages 22.8, 27.9 sentences.	Alphabet warm up Short Words (kept missing first letters on short words) Confused tapes h/n/b m/n/w	(B) Tracking well; still back tracks a little. (D) Problem with first letter of words. Confused m/n/h/b a/e s/a/g	TAPE: Confused tape (continue) h/n/b; Paul Bunyan.
Day 6 P.M.		None	Tapes all p.m. Confused tapes h/n/b Paul Bunyan (speed #4) Limericks	(A) Did much better when we were alone in room. Could concentrate much better. (D) Did not do well on confused tapes. Was much better on Paul Bunyan when speed was pushed up to #4. Bored at lower speed.	CAMERA: Independent, pages 40 (type styles) and 38. Book: J.L. Seagull. TAPES: Limericks (finish Side B; Do Side A). Confused tape h/n/b (finish).

Student'd Name Sample Problem

Uses Tracking Aid? _____

Control Settings:'
I _____ T _____ Z _____

TELESENSORY SYSTEMS, INC.

OPTACON TRAINING LOG

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 7		Independent page 40, 1/2 of page 38. Looked at: checks, catalogue card.	Limericks Confused letters, h/b/n Confused letters, a/e/o/s (finished)	(D) Improving; read sentences fairly steadily. Got enough tape material accurately to make it worth while. Confused letters f/r a/e/o/s. (E) Slow to verbalize words.	CAMERA: Anxious to look at her library materials. Wants to examine forms. Independent, finish page 38; read recipe; Book J.L. Seagull. TAPE: Wants for speed building. Warm up with a/o/e/s (keep at high speed) Get her to read in syllables. Ants - give clues. TAPE: Chanticleer & The Fox.
Day 8 A.M.	Independent page 38 finish. Book: J.L. Seagull.		Warm up Tone Confused letters, a/e/o/s (speed #8-9 did well). Ants (speed 3-1/2 & 4-1/4 missed alot) Short stories: 1st story at 1-2 went back again at slow. I read with her sometime.	(A) Wants to be pushed. (D) Confused s/e a/o s/g o/e n/h a/s	

Student's Name Sample Problem

TELESENSORY SYSTEMS, INC.

Uses Tracking Aid? _____

OPTACON TRAINING LOG

Control Settings:
I _____ T _____ Z _____

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
Day 9 A.M.		Amway Purchase Form Washington Post	Chanticleer & The Fox at record speed. Confused letters a/e/o/s	(B) Keeping letters too low on array Camera still a little crooked. (D) Wanted tape at record speed. She missed well over 50% of words and some entire sentences.	

Student'd Name Problem #1

TELESENSORY SYSTEMS, INC.

Problem Page.

Uses Tracking Aid? No

OPTACON TRAINING LOG

I 3 T Thin Z Big Letters

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
5		Independent, 1. Giant Canary 2. Punctuation Page (for evaluation of tracking skills) Books, 1. J.L. Seaguli (for continued tracking) 2. Ms. Catalogue 3. Telephone Book (for format types, etc.)	Alphabet Warm-up A/E/S Confusion (finished) Goodyear (pica) (up past record speed)	(A) Takes directions well. Hard working and realistic expectations. (B) Tracking excellent orientation on a page and format attack skills; excellent motor skills; camera movement up and down (in order to get tops and bottoms of letters); jerky (C) Finger Position - slips too far in and out of array. (D) Good recognition skills; able to read normally spaced letters. (D) Excellent language skills; verbal; communicative; anticipates well; encourage to sound in syllables orally.	

Problem #1

Student's Name Finger Position: Camera Movement Up & Down

TELESENSORY SYSTEMS, INC.

Solution Page

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:
I 3 T Thin Z Big letters

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods
Day 5 A.M.		Independent, 1. Giant Cannary 2. Punctuation Page (for evaluation of tracking skills) Books, 1. J. L. Seagul (for continued tracking) 2. Ms. Catalogue 3. Telephone Book (for format ty types etc.)	Alphabet Warm-up A/E/S Confusion (finished) Goodyear (pica) (up past record speed)	(A) Takes directions well. Hard working and realistic expectations. (B) Tracking excellent orientation on a page and format attack skills; excellent motor skills; camera movement up and down (in order to get tops and bottoms of letters); jerky (C) Finger Position - slips too far in and out of array. (D) Good recognition skills; able to read normally spaced letters. (E) Excellent language skills; verbal; communicative; anticipates well; encourage to sound in syllables orally.	MOST IMPORTANT: Proper finger position in array. No finger movement CAMERA: 1. Horizontal line check for finger position. 2. Explain letter position on array. Place lower case letter properly on array. Show where ascenders and descenders will be. TAPE: For re-enforcing correct position of image on finger: 1. Morse Code; 2. Newspaper Article CAMERA: Independent, pp.43 - Tracking Practice (total concentration on keeping lines centered). Story, Ample space between letters and lines for tracking practice. Book: Jonathon Livingston Seagull.

Student's Name Problem #2

Senses Tracking Aid? No

Control Settings:
I 2 T 9 Z Middle

TELESENSORY SYSTEMS, INC. Problem Page

OPTACON TRAINING LOG

TEACHER/ DATE AM or PM	HOMESICK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (B) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problemsolving methods)
		Independent, Reviewed 32 Book, "All of Us Are Searching..." pp. 24 & 25. IBM punch cards IBM Manual, pp. contents and 11	Ltd. Alphabet, Speed 4 - 6 Additional Tape Speed 5 - 9 Confused Letters a/e/o/s/ for Words, speed 1 (Successful on all tapes) Assembler Text Speed 2	(A) Congenial, pleasant; says he is lazy; constantly changing materials. BE FIRM - WORK ON SKILLS!! (B) No skewing. Tracks steadily; sometimes letters are too low. (C) OK (D) Excellent (E) Poor. Can spell a word and not be able to pronounce it. Loses interest reading at slow speed. Misses first letter of word often.	

Problem #2

Student's Name Word Recognition

TELESENSORY SYSTEMS, INC.

Solution Page

Uses Tracking Aid? NO

OPTACON TRAINING LOG

Control Settings:
I 2 T 9 Z Middle

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (B) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
		Independent, Reviewed 32 Book, "All of Us Are Searching..." pp. 24 & 25 IBM punch cards IBM Manual, pp. contents and 11	Ltd. Alphabet, Speed 4 - 6 Additional Tape Speed 5 - 9 Confused Letters a/e/c/s for Words, speed 1 (successful on all tapes) Assembler Text Speed 2	(A) constantly changing materials. BE FIRM - WORK ON SKILLS !! (B) No skewing. Tracks readily; sometimes letters are too low. (C) OK (D) Excellent (E) Poor. Can spell a word and not be able to pronounce it. Loses interest reading at slow speed. Misses first letter of word often.	TAPE: Word Recognition Skills. 1. Short words 2. Suffixes 3. Common Word Note: Concentrate on getting first letter of word. Start reading in syllables or word chunks. (Suffixes tape good for this.) 4. Compound Words First Time, teacher tells him long words before they appear. Second time, student tries to read them. CAMERA: Manual 1, Lesson 20 All, Lessons 21 and 22. - Appropriate pages for Word Recognition Skills.

Student's Name Problem #3

TELESENSORY SYSTEMS, INC.

Problem Page

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:

I 2-3 T thin Z large

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods
Day 5 A.M.		1. Business Memo 2. Man the Myth Maker, Wardsworth Poem. 3. Independent p. 19.5 4. Stanford Daily Paper 5. Dictionary	1. Short Stories (Last two) 2. Common words at record speed (bored)	(A) Tense. Constantly jabbering to himself and me while reading. Prefers to struggle over "real world" difficult things rather than doing easier things which may be temporarily boring but will lead to better skills. (B) Main problem - increadibly tense. Still skews badly to the right; will NOT move whole arm - PIVOTS. Still back tracks low much of the time. (C) He tracks low and his finger slips out. (D) Fair. We read many difficult prints therefore hard to evaluate. Because he tracks low, he missed bottom of letters and confused h/b; B/R; v/y; i/j. (E) Good language skills but has not learned to use them to best advantage with Optacon.	

Problem #3

Student's Name Tracking - Skewing, Tense

TELESENSORY SYSTEMS, INC.

Solution Page

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:

I 2-3 T thin Z large

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods).
Day 5 A.M.		1. Business Memo 2. Man the Myth Maker, Wardsworth Poem. 3. Independent p. 19.5 4. Stanford Daily Paper 5. Dictionary	1. Short Stories (Last two) 2. Common words at record speed (bored)	(A) Tense. Constantly jabbering to himself and me while reading. Prefers to struggle over "real world" difficult things rather than doing easier things which may be temporarily boring but will lead to better skills. (B) Main problem - increadibly tense. Still skews badly to the right; will NOT move whole arm - PIVOTS. Still back tracks low much of the time. (C) He tracks low and his finger slips out. (D) Fair. We read many difficult prints therefore hard to evaluate. Because he tracks low, he missed bottom of letters and confused h/b; B/R; v/y; i/j. (E) Good language skills but has not learned to use them to best advantage with Optacon.	Note: Remember to check finger position frequently CAMERA: Independent p.43 Concentrate entirely on tracking: centering figure on array. Relaxed arm movement; must learn to move whole arm. Repeat even though boring. p.3 - keep lines in center of array. p. 41 - smooth, steady movement; build some speed. p. 16 - practice keeping letters centered on array. Use upper case I to check skew. If successful go to stories in Independent or Stage 2

Student's Name Problem #3

TELESENSORY SYSTEMS, INC.

Solution Page #2

Uses Tracking Aid? No

OPTACON TRAINING LOG

Control Settings:

I 2-3 T thin Z large

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
					If not successful, continue p. 25 My reasons for doing those pages: 1. tenseness; if he doesn't have to read letters he may relax a little. 2. Lines are fairly easy to keep centered may be able to keep steady movement and build some speed This is concentrating entirely on motor skill. Kind of like "patterning" (OVER)

Student's Name Problem #4

Problem Page

Uses Tracking Aid? Yes

TELESENSORY SYSTEMS, INC.

OPTACON TRAINING LOG

Control Settings:
I 1:00 T _____ Z Just above middle

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
	Independent 4.1	Manual 1, 2.1 - 5.4,	Upper case Test Tape. 1,2,3 each 3 times (unsuccessful)	(A) Hard worker. (B) Moves camera too fast so much backtracking. Jerky! Movements too big. (C) Position OK. Doesn't seem tense. (D) Needs much practice with letters. Does not know shapes and names very well. Many confusions. R/B G/C C/O D/O T/I H/M (E) Language skills good although knowledge of letter shapes poor.	

Student's Name Problem #4

TELESENSORY SYSTEMS, INC.

Solution Page

Uses Tracking Aid? Yes

OPTACON TRAINING LOG

Control Settings:
I 1:00 T _____ Z Just above middle

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
May 2	Independent 4.1	Manual 1, 2.1 - 5.4	Upper Cast Test Tape. 1,2,3 each 3 times (uncessful)	(A) Hard worker (B) Moves camera too fast so much backtracking. Jerky! Movements too big. (C) Position OK. Doesn't seem tense. (D) Needs much practice with letters. Does not know shapes and names very well. Many confusions. R/B G/C C/O D/O T/I H/M	CAMERA Independent, p.p 40 - tracking evaluation (can she track smoothly across line; could that be letter recognition problem). Manual 1, pp. 4.2 or 6.2 words to build confidence after Test Tape debacke. Student tell teacher "critical feature" of each letter. Story, sentence work and tracking; smooth steady movements. TAPE Warm up, Upper Cast Test 1,2,3 or Upper Case Confused Letters. CAMERA Independent p.p.9-UC alphabet-review (in alphabetical order) letter shapes and names. Use with PLASTIC LETTER Tiles. Teacher point out letter feature. Student repeat.

Student's Name Problem #5

Uses Tracking Aid? _____

Control Settings:
1 2 T 9 Z High

TELESENSORY SYSTEMS, INC.

OPTACON TRAINING LOG

Problem Page

TEACHER/ DATE A.. or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
		Manual 1, 22.7 Independent Left-Handed Dictionary Books, 1. J.L. Seagull 2. I've Had Troubles 3. Wardsworth (Man the Myth Maker page 21)	Lower Case Test Tape. Speed #5 to #7 (finished) Ants #6 to #8 (finished) Goodyear #4 to #5 (1st paragraph, second side) All the above at approximately 16 w.p.m.	(A) Great Student - bright, fun to work with. (B) Not good - very slow - back tracks; skews, unsteady: Keep on tracking aid until she improves. (C) Not in far enough; otherwise OK. (D) Great on tape. (E) Excellent skills; very verbal - anticipates - integrates beautifully.	

Problem #5

Student's Name SKEW

Uses Tracking Aid? Yes

Control Settings:
1 2 T 9 Z High

TELESENSORY SYSTEMS, INC.

OPTACON TRAINING LOG

Solution Page

TEACHER/ DATE AM or PM	HOMEWORK ASSIGNED (Circle if not done)	CAMERA MATERIALS (Give page no's finished)	TAPES/PLOTTER (Indicate speed, degree of success)	COMMENTS/DIFFICULTIES Key: (A) General Impression (B) Tracking (C) Finger Position (D) Recognition (E) Language Skills	NEXT LESSON (Suggest tapes, camera work, and problem-solving methods)
		Manual 1, 22.7 Independent, Left-Handed Dictionary Books, 1. J.L. Seagull 2. I've Had Troubles 3. Wardsworth (Man the Myth Maker page 21)	Lower Case Test Tape. Speed #5 to #7 (finished) Ants #6 to #8 (finished) Goodyear #4 to #5 (1st paragraph, second side) All the above at approximately 16 w.p.m.	(A) Great Student - bright, fun to work with. (B) Not good - very slow - back tracks; skews, unsteady: Keep on tracking aid until she improves. (C) Not in far enough; otherwise OK. (D) Great on tape. (E) Excellent skills; very verbal - anticipates - integrates beautifully.	Note: Assuming that back tracking is caused by letter not coming on straight, correct skewing as follows: 1. Hand lightly on camera let "roller" do the work. 2. DO NOT pivot from wrist or elbow. 3. Hold camera in a position PERPINDICULAR to letters. To check this - find the letter "l". Is it straight on array? 4. If "l" is slanted to RIGHT, move lens to RIGHT to correct. If "l" is slanted to LEFT, move lens LEFT to correct. CAMERA: Independent Stories (good letter spacing and long line tracking). TAPE: Goodyear or Casey Jones (for a break from tracking).

APPENDIX IV

BIBLIOGRAPHY FOR OPTACON READERS AND TRAINERS

The following bibliography is designed to help the Optacon trainer find the book most suited to the student's interests and ability to read with the Optacon. The books provide a range of difficulty, and they may be used after the student has been introduced to all of the upper and lower case alphabets. The books may be used in conjunction with the manual to introduce different formats and to provide extra reading practice, and they may be used upon finishing the manual to provide speed building practice.

The books cover three levels of difficulty -- easy, medium and hard -- in three different areas -- print style, format (layout of the book), and reading level. A book is usually not consistent in difficulty in all three areas. One with easy, short selections may be put together in a confusing and inconsistent manner. Each book is judged in each area. The levels are defined as follows:

Print: Print varies in difficulty for the Optacon reader according to the number of complications on the letter itself (serifs, curlicues, varying stroke widths), the size of the letter, and the amount of contrast between the letter and the background.

A. Easy: sans-serif; even, narrow stroke widths; medium to large size
B. Medium: simple serifs; uneven stroke widths; medium to large size
C. Hard: many serifs; extreme variation in stroke widths; small size

Format: Book layouts vary in difficulty according to the amount of unused space on the page, the page numbering system, the number of type styles, the number and placement of pictures, and the variety of written material.

A. Easy: little empty space; consistent written material (all essays, all quotes); consistent placement on page; consistent, easy print style.

B. Medium: moderate use of pictures or different types of material or print styles

C. Hard: inconsistent placement of material on page; use of many different types of material or print styles.

Level: Books vary according to literary difficulty (reading level, and sophistication of content) and length of selection.

A. Easy: short selections, and/or simple syntax, and/or simple themes

B. Medium: longer selections (1-4); and/or more complicated syntax; and/or more adult themes

C. Hard: novels, or long selections; sophisticated, complicated syntax; and/or adult themes.

The category of "appeal" is included to designate whether the book is geared to elementary or high school students, or to adults.

The abbreviations "pb" and "hb" after the copyright date refer to paperback and hardback respectively.

Publishers' addresses are listed at the end of the bibliography.

BIBLIOGRAPHY

All of Us Are Searching for Success, Bevins Jay; Stanyan Books, c 1972, hb, $3.00

Print: easy
Format: medium -- short quotes from famous authors (widely spaced); consistent format
Level: easy -- short selections suitable for beginning students
Appeal: adult, high school

easy gourmet from stanford, The Mothers' Club of Stanford University, c 1969, pb, $2.75

Print: easy -- sans-serif, no capitals
Format: easy cookbook - ingredients in double column above instructions; consistent format
Level: medium -- useful for practice in numbers, abbreviations, tracking
Appeal: adult, high school

I've Had Troubles Too . . . So I Brought You This Book, Keith Fallon, Stanyan Books, c 1972, hb, $3.00

Print: easy
Format: medium -- widely spaced, humorous short quotes from famous authors; consistent format
Level: easy -- short selections suitable for beginning students
Appeal: adult, high school

Jonathan Livingston Seagull, Richard Bach, Macmillian Company, c 1970, hb, $4.95 (book available in paperback from Avon Books, same print style)

Print: easy
Format: medium -- long chapters and continuing story difficult for beginner; style not difficult
Level: hard
Appeal: adult, high school

Keep Smiling and Have A Happy Day, Allen James, Stanyan Books, c 1972, hb, $3.00

Print: medium -- varying print sizes, some white print on magenta background
Format: medium -- short quotes from famous authors; varying placement on page
Level: easy -- short selections suitable for beginners
Appeal: adult, high school

Notes to Myself, Hugh Prather, Real People Press, c 1970, pb, $2.00

Print: easy
Format: medium -- philosophical selections of varying length, from paragraph to page; end of selection signified by leaf design; unnumbered pages.
Level: medium
Appeal: adult

Rafting Down the Neckar, Mark Twain, Fritz Gebhard, KG, European Places of Culture Edition, edited by Wolfgang Boehler, C 1966, pamphlet, 2 DM

Print: easy
Format: medium -- syntax complicated, vocabulary sometimes unusual, pictures
Level: hard
Appeal: adult

Short, Short Stories, Vol. I, M.W. Sullivan Reading Program, Behavioral Research Laboratories, c.1972, pb, $1.99

Print: easy -- large typewriter print, simple serif
Format: hard -- short paragraphs, pictures; questions follow story
Level: easy -- 3rd, 4th grade reading ability, stories 50-150 words in length
Appeal: limited for adults since many stories very simple, good for elementary students, poor readers

Some Haystacks Don't Even Have Any Needle, Stephen Dunning, Edward Lueders, Hugh Smith; Scott, Foresman and Co., c 1969, pb, $2.10 (same print in hb)

Print: medium -- thick, dark strokes, sans-serif
Format: hard -- pictures, poems, uneven line length, inconsistency in placement of poems
Level: hard -- unexpected turns of phrase in poems difficult for beginning reader
Appeal: adult

Take 12/Action Plays, Mel Cebulash, Scholastic Book Services, c 1970, pb, $1.80

Print: easy -- sans-serif, some sans-serif italics
Format: medium -- 2-3 page, open-ended situation plays; italics used for stage setting
Level: medium
Appeal: high school

EDUCATIONAL CHALLENGES SERIES

The Girl Who Knew Rule One, Marilyn Lyman, Scholastic Book Services, SA 2092, c 1972, pb, $1.80

Print: easy
Format: medium -- story in 10 chapters of approximately 10 pages each, photographs; personal problem solving involving teenage girl on probation, drugs, love; hospital setting
Level: medium -- 2.5-2.9 grade reading ability; suitable for speed building
Appeal: geared to high school, some appeal for adults

The Ratcatcher of Whitestone, William F. Ryan, Scholastic Book Services, SA 1876, c 1971, pb, $1.80

Print: easy
Format: medium -- 10 chapters of approximately 10 pages each; mystery story
Level: medium -- 2.5-2.9 grade reading ability; suitable for speed building
Appeal: geared to high school; mystery aspect suitable for adults

The following titles in this series have limited appeal for adults -- strongly geared toward adolescents; not ordered by TSI

A New Life for Sarita, John Durham, SA 1563; Spanish-American culture clash

Crash at Salty Bay, Pete Pomeroy, SA 1925; adventure, seacost setting

No Girls Allowed, Keven Jane Harvey, SA 1878; surfing

One Punch Away, John Greenya, SA 1881; boxing

Silver Dollar Mystery, Leslie Carswell, SA 1924; kids get involved in a theft ring

The House That Half Jack Built, Eloise Engle, SA 1879; personal triumph, sibling rivalry

The Race Driver, W.E. Butterworth, SA 1923; adventure in race car setting

The '50 Ford, John Greenya, SA 1877; personal triumph, car setting

HOLT SERIES

I've Got A Name, Lawana Trout, Charlotte K. Brooks; Holt's Impact Series, Level I; Holt, Rinehart and Winston, Inc., c 1968, pb, $1.84

Print: easy -- shaded sans-serif (titles hard)
Format: medium -- long and short stories interspersed with poems, songs, pictures; "growing-up" theme
Level: medium (some short selections easy and suitable for beginners)
Appeal: adult, high school

Larger Than Life, Edith Stull; Holt, Rinehart and Winston, Inc., c 1968, pb, $1.84

Print: easy -- shaded sans-serif (titles hard)
Format: medium -- long and short stories, poems, fables, songs, photographs, pictures; myth, legend theme
Level: medium (some short selections easy and suitable for beginners)
Appeal: adult, high school

The following titles in this series have limited appeal for adults -- strongly geared toward adolescents; not ordered by TSI

At Your Own Risk, Trout, Pierson; thems of adventure, daring

Cities, Stull; inner-city themes

SULLIVAN SERIES

Bad Luck Sam, M.W. Sullivan Reading Program, Story #3, Behavioral Research Laboratories, c 1971, pb, $.99

Print:: easy
Format: medium -- large cartoons with sentences below, occasionally in middle of page; humorous story of a man with legendary bad luch
Level: easy -- 1st, 2nd grade reading ability
Appeal: high interest, low vocabulary book created for older non-reader

The Camp by the Pond, M. W. Sullivan Reading Program, Story #2, Behavioral Research Laboratories, c 1971, pb, $.99

Print: easy
Format: medium -- large cartoons with sentences below, occasionally in middle of page; humorous story of two men, two pets, and a rainy camping experience
Level: easy -- 1st, 2nd grade reading ability
Appeal: high interest, low vocabulary book created for older non-reader

PUBLISHERS

Avon Books
The Hearst Corporation
959 8th Avenue
New York, New York 10019

Behavioral Research Laboratories
Ladera Professional Center
Box 577
Palo Alto, California 94302

Fritz Gebhard, KG
Heidelberg, Germany

Holt, Rinehart and Winston
Crocker Industrial Park
Brisbane, California

Macmillian Company
866 Third Avenue
New York, New York 10022

Real People Press
Box F
Moab, Utah 84532

Scholastic Book Services
904 Sylvan Avenue
Englewood Cliffs, New Jersey 17632

Scott, Foresman and Company
855 California Avenue
Palo Alto, California 94304

Stanyan Books
(A Division of Random House)
8721 Sunset Boulevard
Suite C
Hollywood, California 90069

The Mothers' Club of Stanford University
P. O. Box 4445
Stanford, California 94305

TELESENSORY SYSTEMS, INC.
2626 Hanover Street
Palo Alto, California 94304

TRAINING MATERIALS

Item	Stock Number
Optacon Training: Stage I	RI7450-A
Teacher's Edition	RI7415-A
Stage I Teacher's (Braille)	RI7457-A
Independent Practice	RI7452-A
Optacon Training; Stage 2	RI7453-A
Teaching Guidelines (Avail. 9/73)	RI7454-A
Braille Optacon Instruction Manual	RI7402-A

*One copy of RI7450-A is included with each Optacon purchased at no charge.

CAPABILITIES TO CONSIDER IN ASSESSING OPTACON READING POTENTION	TEST USED TO MEASURE THIS FACTOR
1. INTELLIGENCE	The Wechsler Adult Intelligence Scale (Publisher: The Psychological Corp.)
2. ORIENTATION CONCEPTS	Stanford Multi-Modality Imagery Test (Publisher: American Foundation for the Blind)
3. PERSONALITY FACTORS Michael Tobin* found that ability to learn to read Braille correlated positively with intelligence, tactual discrimination, and personality factors A and F of the IPAT inventory.	The IPAT Sixteen Personality Factor Profile (Publisher: Institute for Personality and Ability Testing)
4. TACTILE SENSITIVITY	Pressure Threshold - tests used by neurologists might be adapted.
5. TACTILE RESOLUTION	Two-point Threshold Measurements
6. TACTILE IMAGE PERCEPTION * Tobin, M.J.: Programmed Instruction and Braille Learning. An experimental and multivariate investigation of Some Teaching and Psychological Variables. Research Centre for the Education of the Visually Handicapped, School of Education, University of Birmingham, England, 1971	1. Tobin's Tactile Discrimination Test (experimental) 2. Optacon Perception test (experimental)
7. ATTENTION SPAN	1. The Stanford-Kons Block Design Test for the Blind 2. The Stanford Multi-Modality Imagery Test
8. LANGUAGE FACILITY	The Wechsler Adult Intelligence Scale (vocabulary subtest)

CAPABILITIES TO CONSIDER IN ASSESSING OPTACON READING POTENTIAL	TEST USED TO MEASURE THIS FACTOR
9. MOTIVATION, PERSISTANCE	1. The Stanford-Kohs Block Design Test 2. The Stanford Multi-Modality Imagery Test (measure time before subject gives up on task) 3. The IPAT Sixteen Personality Factor Profile
10. BRAILLE READING SKILL Our experience indicates that those adult characteristics which are important for learning to read braille are important for Optacon learning as well.	Braille Reading Test taken from the Diagnostic Reading Tests Survey Section: Upper Level, Form A